

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

- 1 1. (Currently Amended) A display apparatus comprising:
2 a display unit having a matrix of multiple pixels;
3 a divider to divide ~~a field~~ each of a plurality of fields of a digital input video
4 ~~signal to be supplied to the display unit into a specific N number of subfields~~ each
5 subfield having a period shorter than a period of each field, N being a positive
6 integer of two or larger;
7 a memory storing a look-up table to be used by the divider for dividing the
8 field into the subfields, the look-up table listing data for selectively turning ~~turn~~ on
9 and off the subfields in accordance with gradation levels of the digital video signal,
10 an image being ~~to be~~ displayed on the display unit when the subfields are
11 ~~selectively turn~~ turned on; and
12 a driver to drive the pixels of the display unit per specific N number of
13 subfields so that an image based on the digital input video signal is displayed on
14 the display unit,
15 ~~wherein the specific number of subfields are aligned in the look-up table in~~
16 ~~order of displaying the image, display periods of the subfields become longer or~~
17 ~~shorter in order of displaying the image, a difference in display period between~~
18 ~~subfields becomes smaller per one subfield or per several number of the subfields~~
19 ~~as the display periods become longer~~
20 wherein the data are arranged in the look-up table such that
21 the N number of subfields are aligned from a first subfield to an N-th
22 subfield in an image-displaying order,
23 display periods of the subfields become longer from the first subfield
24 towards the N-th subfield or from the N-th subfield towards the first subfield,
25 a difference in display period between subfields adjacent to each other
26 becomes smaller per at least one subfield as the display periods become longer,
27 for specific gradation levels at which false contour effects have to be
28 restricted, a specific subfield to be turned on is shifted by one subfield in the
29 image-displaying order, or the specific subfield is kept on when the specific

subfield is once turned on and one of subfields having shorter display periods than the specific subfield is turned on, per gradation-level change,
for gradation levels except the specific gradation levels, a subfield to be turned on is shifted by at least one subfield in the image-displaying order, per gradation-level change, and
wherein when a subfield having the longest display period among the N number of subfields is turned from off to on at a certain gradation level, the subfield thus turned on is kept on at gradation levels higher than the certain gradation levels.

2. (Canceled)

3. (Currently Amended) A display apparatus comprising:

a display unit having a matrix of multiple pixels;
a divider to divide ~~a field~~ each of a plurality of fields of a digital input video signal ~~to be supplied to the display unit into a specific N number of subfields each subfield having a period shorter than a period of each field, N being a positive integer of two or larger;~~

a memory storing a look-up table to be used by the divider for dividing the field into the subfields, the look-up table listing data for selectively turning ~~turn~~ on and off the subfields in accordance with gradation levels of the digital video signal, an image being ~~to be~~ displayed on the display unit when the subfields are selectively ~~turn~~ turned on; and

a driver to drive the pixels of the display unit per ~~specific N~~ number of subfields so that an image based on the digital input video signal is displayed on the display unit,

~~wherein the specific number of subfields are aligned in the look-up table in order of displaying the image, display periods of the subfields become longer or shorter in order of displaying the image, a difference in display period between subfields is constant over the subfields~~

wherein the data are arranged in the look-up table such that

20 the N number of subfields are aligned from a first subfield to an N-th
21 subfield in an image-displaying order.
22 display periods of the subfields become longer from the first subfield
23 towards the N-th subfield or from the N-th subfield towards the first subfield,
24 a difference in display period between subfields adjacent to each other is
25 constant over the N number of subfields.
26 through the gradation levels, a specific subfield to be turned on is shifted
27 by one subfield in the image-displaying order, or the specific subfield is kept on
28 when the specific subfield is once turned on and one of the subfields having
29 shorter display periods than the specific subfield is turned on, per gradation-level
30 change, and
31 wherein when a subfield having the longest display period among the N
32 number of subfields is turned from off to on at a certain gradation level, the
33 subfield thus turned on is kept on at gradation levels higher than the certain
34 gradation levels.

1 4.(Canceled)

1 5.(Currently Amended) A display apparatus comprising:
2 a display unit having a matrix of multiple pixels;
3 a divider to divide ~~a field~~ each of a plurality of fields of a digital input video
4 ~~signal to be supplied to the display unit~~ into a specific number of subfields each
5 subfield having a period shorter than a period of each field;
6 a memory storing a look-up table to be used by the divider for dividing the
7 field into the subfields, the look-up table listing data for selectively turning ~~turn~~ on
8 and off the subfields in accordance with gradation levels of the digital video signal,
9 an image being ~~to be~~ displayed on the display unit when the subfields are
10 selectively ~~{turn}~~ turned on; and
11 a driver to drive the pixels of the display unit per specific number of
12 subfields so that an image based on the digital input video signal is displayed on
13 the display unit,

14 wherein the specific number of subfields is divided into a first subfield
15 group and a second subfield group aligned in the look-up table in order of
16 displaying the image, first subfields in the first subfield group have display periods
17 that become longer or shorter in order of displaying the image whereas second
18 subfields in the second subfield group have a display period constant over the
19 second subfields

20 wherein the data are arranged in the look-up table such that
21 the specific number of subfields are divided into a first subfield group and
22 a second subfield group aligned in an image-displaying order,

23 first subfields of the first subfield group are aligned from a first subfield to
24 an N-th subfield in the image-displaying order, N being a positive integer of two or
25 larger but smaller than the specific number, display periods of the first subfields
26 becoming longer from the first subfield towards the N-th subfield whereas second
27 subfields of the second subfield group that follows the first subfield group in the
28 image-displaying order have a display period longer than the first subfields of the
29 first subfield group and constant over the second subfields,

30 or the display periods of the first subfields of the first subfield group
31 become longer from the N-th subfield towards the first subfield whereas the
32 second subfields of the second subfield group that precedes the first subfield
33 group in the image-displaying order have a display period longer than the first
34 subfields of the first subfield group and constant over the second subfields,

35 through the gradation levels, a specific one subfield to be turned on or
36 specific two subfields to be turned on are shifted by one subfield in the image-
37 displaying order or the specific one subfield or the specific two subfields are kept
38 on when once turned on and one of the subfields having shorter display periods
39 than the specific subfield or the specific two subfields is turned on, per gradation-
40 level change, and

41 wherein when a subfield having the longest display period among all of the
42 subfields in the first and second subfield groups is turned from off to on at a
43 certain gradation level, the subfield thus turned on is kept on at gradation levels
44 higher than the certain gradation level.

6. (Canceled)

7. (Currently Amended) A display apparatus comprising:

a display unit having a matrix of multiple pixels;

a divider to divide ~~a field~~ each of a plurality of fields of a digital input video signal ~~to be supplied to the display unit~~ into a specific number of subfields each subfield having a period shorter than a period of each field;

a memory storing a look-up table to be used by the divider for dividing the field into the subfields, the look-up table listing data for selectively turn on and off the subfields in accordance with gradation levels of the digital video signal, an image being to be displayed on the display unit when the subfields are selectively turn turned on; and

a driver to drive the pixels of the display unit per specific number of subfields so that an image based on the digital input video signal is displayed on the display unit,

~~wherein the specific number of subfields is divided into a first subfield group, a second subfield group and a third subfield group aligned in the look-up table in order of displaying the image, first subfields in the first subfield group have display periods that become shorter in order of displaying the image, second subfields in the second subfield group have display periods shorter than the display periods of the first subfields, and third subfields in the third subfield group have display periods that become longer in order of displaying the image~~

wherein the data are arranged in the look-up table such that the specific number of subfields are divided into a first subfield group, a second subfield group and a third subfield group aligned in an image-displaying order, the first subfield group preceding the second subfield group that precedes the third subfield group in the image-displaying order,

first subfields of the first subfield group are aligned from a first subfield to an N-th subfield in the image-displaying order, N being a positive integer of two or larger but smaller than the specific number, display periods of the first subfields becoming shorter from the first subfield towards the N-th subfield, third subfields of the third subfield group are aligned from a first subfield to an M-th subfield in the

image-displaying order, M being a positive integer of two or larger but smaller than the specific number, display periods of the third subfields becoming longer from the first subfield towards the M-th subfield, and all of display periods of second subfields of the second subfield group are shorter than a display period of the N-th subfield of the first subfield group and also a display period of the first subfield of the third subfield group.

through the gradation levels, a specific one subfield to be turned on in the first subfield group is shifted by one subfield in the image-displaying order, or the specific subfield of the first subfield group is kept on when once turned on and one of the subfields in the second subfield group having a shorter display period than the specific subfield of the first subfield group is turned on, per gradation-level change.

through the gradation levels, a specific one subfield to be turned on in the third subfield group is shifted by one subfield in the image-displaying order, or the specific subfield of the third subfield group is kept on when once turned on and one of the subfields in the second subfield group having a shorter display period than the specific subfield of the third subfield group is turned on, per gradation-level change, and

wherein when a subfield having the longest display period in the first subfield group is turned from off to on at a certain gradation level, the subfield thus turned on in the first subfield is kept on at gradation levels higher than the certain gradation level or when a subfield having the longest display period in the third subfield group is turned from off to on at a certain gradation level, the subfield thus turned on in the third subfield group is kept on at gradation levels higher than the certain gradation level.

8. (Canceled)

9. (Canceled)

10. (Currently Amended) A display apparatus comprising:
a display unit having a matrix of multiple pixels;

3 a divider to divide ~~a field~~ each of a plurality of fields of a digital input video
4 ~~signal to be supplied to the display unit~~ into a specific number of subfields each
5 subfield having a period shorter than a period of each field;

6 a memory storing a look-up table to be used by the divider for dividing the
7 field into the subfields, the look-up table listing data for selectively turning ~~turn~~ on
8 and off the subfields in accordance with gradation levels of the digital video signal,
9 an image being ~~to be~~ displayed on the display unit when the subfields are
10 selectively [~~turn~~] turned on; and

11 a driver to drive the pixels of the display unit per specific number of
12 subfields so that an image based on the digital input video signal is displayed on
13 the display unit,

14 wherein the specific number of subfields is divided into a first subfield
15 group, a second subfield group and a third subfield group aligned in the look-up
16 table in order of displaying the image, first subfields in the first subfield group have
17 a display period constant over the first subfields, second subfields in the second
18 subfield group have display periods shorter than the display period of the first
19 subfields, and third subfields in the third subfield group have a display period
20 constant over the third subfields

21 wherein the data are arranged in the look-up table such that
22 the specific number of subfields are divided into a first subfield group, a
23 second subfield group and a third subfield group aligned in an image-displaying
24 order, the first subfield group preceding the second subfield group that precedes
25 the third subfield group in the image-displaying order,

26 first subfields of the first subfield group have a display period constant
27 over the first subfields, third subfields of the third subfield group have a display
28 period constant over the third subfields, and second subfields of the second
29 subfield group have display periods shorter than the display periods of the first and
30 third subfields in the first and third subfield groups, respectively,

31 through the gradation levels, a specific one subfield to be turned on in the
32 first subfield group is shifted by one subfield in the image-displaying order per
33 gradation-level change and at least one of the second subfields in the second

subfield group is turned on when the specific one subfield of the first subfield group is shifted,
through the gradation levels, a specific one subfield to be turned on in the third subfield group is shifted by one subfield in the image-displaying order per gradation-level change and at least one of the second subfields in the second subfield group is turned on when the specific one subfield of the third subfield group is shifted, and
wherein when a subfield located first in the first subfield group in the image-displaying order is turned from off to on at a certain gradation level, the subfield thus turned on in the first subfield group is kept on at gradation levels higher than the certain gradation level or when a subfield located last in the third subfield group in the image-displaying order is turned from off to on at a certain gradation level, the subfield thus turned on in the third subfield group is kept on at gradation levels higher than the certain gradation level.

11. (Canceled)

12. (Canceled)

13. (Currently Amended) A display apparatus comprising:

a display unit having a matrix of multiple pixels;

a divider to divide ~~a field~~ each of a plurality of fields of a digital input video signal ~~to be supplied to the display unit~~ into a specific number of subfields each subfield having a period shorter than a period of each field;

a memory storing a look-up table to be used by the divider for dividing the field into the subfields, the look-up table listing data for selectively turning ~~turn~~ on and off the subfields in accordance with gradation levels of the digital video signal, an image being ~~to be~~ displayed on the display unit when the subfields are selectively turn ~~turned~~ on; and

a driver to drive the pixels of the display unit per specific number of subfields so that an image based on the digital input video signal is displayed on the display unit,

wherein the specific number of subfields are aligned into a subfield sequence in order of displaying the image in the look-up table, the specific number of subfields are divided into a first subfield group, a second subfield group and a third subfield group, subfields of the first subfield group have first different display periods, subfields of the second subfield group have second display periods all longer than the first display periods, the second display periods becoming shorter in order of displaying the image, the third subfield group have third display periods becoming longer in order of displaying the image, the subfields of the first subfield group being dispersed into the second and third subfield groups, the subfields of the second subfield group and the subfields of the first subfield group dispersed into the second subfield group consisting of a former half of the subfield sequence in order of displaying the image, the subfields of the third subfield group and the subfields of the first subfield group dispersed into the third subfield group consisting of a latter half of the subfield sequence in order of displaying the image; a total of the display periods in the former half of the subfield sequence and a total of the display periods in the latter half of the subfield sequence being almost equal to each other

wherein the data are arranged in the look-up table such that the specific number of subfields are divided into a first subfield group, a second subfield group and a third subfield group, the second and third subfield groups being aligned in an image-displaying order, the second subfield group preceding the third subfield group in the image-displaying order

second subfields of the second subfield group are aligned from a first subfield to an N-th subfield in the image-displaying order, N being a positive integer of two or larger but smaller than the specific number, display periods of the second subfields of the second subfield group becoming shorter from the first subfield towards the N-th subfield,

first subfields of the first subfield group are dispersed into the second and third subfield groups and display periods of all of the first subfields are shorter than a display period of the N-th subfield of the second subfield group,

third subfields of the third subfield group are aligned from a first subfield to an M-th subfield in the image-displaying order, M being a positive integer of two or

46 larger but smaller than the specific number, display periods of the third subfields
47 becoming longer from the first subfield to the M-th subfield.

48 the first subfield of the second subfield group having the longest display
49 period in the second subfield group is located at the top of all of the subfields in
50 the first, second and third subfield groups whereas the M-th subfield of the third
51 subfield group having the longest display period in the third subfield group is
52 located at the last of all of the subfields in the first, second, and third subfield
53 groups.

54 when all of the subfields in the first, second, and third subfield groups are
55 divided into a former group including the second subfield group and a latter group
56 including the third subfield group in the image-displaying order, a total of the
57 display periods in the former group and a total of the display periods in the latter
58 group are almost equal to each other.

59 through the gradation levels, a specific one subfield to be turned on in the
60 second subfield group is shifted by one subfield in the image-displaying order, or
61 the specific subfield of the second subfield is kept on when once turned on and
62 one of the subfields in the first subfield group having a shorter display period than
63 the specific subfield of the second subfield is turned on, per gradation-level
64 change.

65 through the gradation levels, a specific one subfield to be turned on in the
66 third subfield group is shifted by one subfield in the image-displaying order, or the
67 specific subfield in the third subfield group is kept on when once turned on and
68 one of the subfields in the first subfield group having a shorter display period than
69 the specific subfield of the third subfield group is turned on, per gradation-level
70 change, and

71 wherein when a subfield having the longest display period in the second
72 subfield group is turned from off to on at a certain gradation level, the subfield thus
73 turned on is kept on at gradation levels higher than the certain gradation level or
74 when a subfield having the longest display period in the third subfield group is
75 turned from off to on at a certain gradation level, the subfield thus turned on is
76 kept on at gradation levels higher than the certain gradation level.

14. (Canceled)

15. (Canceled)

16. (Currently Amended) A display apparatus comprising:

a display unit having a matrix of multiple pixels;

a divider to divide ~~a field~~ each of a plurality of fields of a digital input video signal ~~to be supplied to the display unit~~ into a specific number of subfields each subfield having a period shorter than a period of each field;

a memory storing a look-up table to be used by the divider for dividing the field into the subfields, the look-up table listing data for selectively turning ~~turn~~ on and off the subfields in accordance with gradation levels of the digital video signal, an image being ~~to be~~ displayed on the display unit when the subfields are selectively turn ~~turned~~ on; and

a driver to drive the pixels of the display unit per specific number of subfields so that an image based on the digital input video signal is displayed on the display unit,

wherein the specific number of subfields are aligned into a subfield sequence in order of displaying the image in the look-up table, the specific number of subfields are divided into a first subfield group, a second subfield group and a third subfield group, subfields of the first subfield group have first different display periods, subfields of the second subfield group have a constant second display period longer than the first display periods, subfields of the third subfield group have a constant third display period, the subfields of the first subfield group being dispersed into the second and third subfield groups, the subfields of the second subfield group and the subfields of the first subfield group dispersed into the second subfield group consisting of a former half of the subfield sequence in order of displaying the image, the subfields of the third subfield group and the subfields of the first subfield group dispersed into the third subfield group consisting of a latter half of the subfield sequence in order of displaying the image, a total of the display periods in the former half of the subfield sequence and a total of the

display periods in the latter half of the subfield sequence being almost equal to each other

wherein the data are arranged in the look-up table such that the specific number of subfields are divided into a first subfield group, a second subfield group and a third subfield group, the second and third subfield groups being aligned in an image-displaying order, the second subfield group preceding the third subfield group in the image-displaying order,

second subfields of the second subfield group are aligned from a first subfield to an N-th subfield in the image-displaying order, N being a positive integer of two or larger but smaller than the specific number, display periods of the second subfields of the second subfield group being constant over the second subfields,

third subfields of the third subfield group are aligned from a first subfield to an M-th subfield in the image-displaying order, M being a positive integer of two or larger but smaller than the specific number, display periods of the third subfields being constant over the third subfields,

first subfields of the first subfield group are dispersed into the second and third subfield groups and display periods of all of the first subfields are shorter than the display periods of the second and third subfields of the second and third subfield groups, respectively,

the first subfield of the second subfield group is located at the top of all of the subfields in the first, second and third subfield groups whereas the M-th subfield of the third subfield group is located at the last of all of the subfields in the first, second, and third subfield groups,

when all of the subfields in the first, second, and third subfield groups are divided into a former group including the second subfield group and a latter group including the third subfield group in the image-displaying order, a total of the display periods in the former group and a total of the display periods in the latter group are almost equal to each other,

through the gradation levels, a specific one subfield to be turned on in the second subfield group is shifted by one subfield in the image-displaying order and at least one of the first subfields of the first subfield group is turned on when the

specific one subfield of the second subfield group is shifted, per gradation-level change,
through the gradation levels, a specific one subfield to be turned on in the third subfield group is shifted by one subfield in the image-displaying order and at least one of the first subfields of the first subfield group is turned on when the specific one subfield of the third subfield group is shifted, per gradation-level change, and
wherein when the first subfield located at the top of all of the subfields in the first, second and third subfield groups is turned from off to on at a certain gradation level, the first subfield thus turned on is kept on at gradation levels higher than the certain gradation level or when the M-th subfield located at the last of all of the subfields in the first, second and third subfield groups is turned from off to on at a certain gradation level, the M-th subfield thus turned on is kept on at gradation levels higher than the certain gradation level.

17. (Canceled)

18. (Canceled)